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Colorado Geographic Information Project (CGIP):
A Review of Past Coordination Efforts and Geographic Information System Initiatives in State Government.

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1. Introduction

"Geographic information" is any data that can be referenced to a specific location. It includes distribution and use of natural resources; patterns of land use; descriptions of infrastructure; property rights, ownership, regulations and valuation; and socioeconomic information, such as health, employment, housing and voting habits of people. Geographic information is generated, collected, processed and analyzed by many public and private entities. A great deal of public funds are spent on geographic information, and some estimates are that over 70 percent of data used by government can be referenced by location.

Numerous studies conclude that to be most useful, information must be disaggregated, coordinated and integratable. A conceptual focus on geographic information meets these needs and usefulness is enhanced by technical capabilites to manage and display information in a graphic, user-defined manner. Today's technologies improve generation, storage, retrieval, manipulation and accuracy of geographic information. A focus on geographic information in particular integrates improving data processing, telecommunications, and satellite imagery and positioning technologies. Resulting improved knowledge and technology can help make important policy, management, planning and investment decisions.

Colorado has a unique opportunity to initiate a coordinated focus on geographic information and develop an important resource and integrated network of information. Strategic use of and investment in this resource can enable us to capitalize on one of our unique strengths, location, as our competitive edge in the world economy. State government can use this concept as a framework for maximizing information to improve the effectiveness of government. Development of this resource or network will require a useful process and objective for improved interagency, intergovernmental, and public/private/academic cooperation. As a first step, Governor Romer referred the issue of geographic information to the Colorado Department of Highways to develop a focus, framework, analysis and coordinated approach within State government. This effort has been underway since April, 1987 and is including various educational, awareness, analysis and coordination initiatives.

This report represents the first in a series of analyses about geographic information in Colorado. This review of past State government initiatives and projects shows increasing activity and need. It also identifies opportunities for coordination and sharing of information to improve governmental effectiveness and our economic development resources.

2. Past Coordination Efforts

2.1 1970-1979: Cartographic Program/State Mapping Advisory Committee

Geographic Information coordination efforts in Colorado can be traced to the early 1970s. These efforts centered on the development of mapping products, and a cartographic program evolved from an original executive order dated July 1, 1974 entitled "The Assignment of Cartographic Responsibilities and the Creation of a State Mapping Advisory Committee". This order was annually renewed from 1975 to 1978 with annual meetings of the membership of the committee including state agencies, regional and local governments, academic institutions, scientific and technical organizations, and federal agencies. Colorado was one of the first states to officially establish a State Mapping Advisory Committee (SMAC) in cooperation with the U.S. Geological Survey (USGS). The committee was chaired by the State Cartographer who resided in the Division of Planning of the Department of Local Affairs and carried out the directives of the committee. Various subcommittees and workshops were organized including remote sensing, hand parcel identification and assessor systems, state plane coordinates, and geographic information systems.

One of the main accomplishments of the cartographic program was the development of the 1:50,000 county map series developed through a four-year cooperative program between the Division of Planning and the USGS. Plans to design and develop a state Geographic Information System (GIS) began as early as 1978. During this time, the Legislative Joint Budget Committee reviewed the potential for GIS technology to be used for reapportionment purposes, and it decided to fund the development of such a system within the Division of Planning. In addition, it was anticipated that that system could be utilized as a tool to help a variety of planning functions.

The purchase and development of the GIS at the end of the decade was accompanied by a reactivation of the SMAC. Two executive orders were signed in 1979 separately authorizing the committee and cartographic program. These orders represent the most recent executive actions regarding geographic information. Subcommittees and workshops were held on GIS, Coordinate Systems, Remote Sensing, Aerial Photography, Geographic Names, Land Parcel Identification and Assessment Systems, and Global Positioning Systems were established during this decade.

2.2 1980-1985: GIS Development, But Reduced Commitment

The beginning of this decade included a high level of activity regarding the development of the GIS and the Western States Geographic Names Conference which was held here in 1982. During the implementation of the GIS and completion of the 1:50,000 scale maps, the Division of Planning was abolished within the Department of Local Affairs. In early 1981, many of its functions, including the cartographic program, were moved to the Division of Local Government. These activities, including the State Mapping Advisory Committee and the State Cartographer's

Office, continued within the Division of Local Government until 1983. At that time, state policy changes further reduced the perceived need and funding levels for planning purposes. As a result, the cartographic program was proposed to be moved to a new location within the State Geologist's Office in the Department of Natural Resources. General budget cuts in 1983 resulted in the abolition of the state cartographer position, and, in conjunction with its removal, the State Mapping Advisory Committee was essentially dissolved.

Since 1983, a variety of Geographic Information coordination activities have emerged at various levels within Colorado. Soon after the committee dissolved, some initiative to develop a digital coordination group began within the Department of Highways, but it was not continued. The GIS continued to be maintained within the Division of Local Government under the auspices of the State Demographer, and it continues to be used today for jurisdictional boundary definitions and special map projects for the division.

2.3 1985-Present: Individualized and Expanded Initiatives

During 1985, a Colorado Travel Map Task Force was developed with members representing state and local governments. The Task Force identified categories, format, design, and responsible parties for data displayed on the Colorado Travel Map. A useful list of categories, criteria and sources as prepared and is still being used today.

A coordination effort and land records reform initiative also emerged in Colorado in 1985 through the work of professionals from various fields in the public, private, and academic sectors. A State Land Information Network had been developed in 1984 by the Urban and Regional Information Systems Association Chapter in Colorado, and this organization provided a main forum for the sharing of information and activities in an informal manner. The conclusions developed at many of these meetings were that state government needed to develop an appropriate policy and direction regarding geographic information, and that such a focus had not existed since the elimination of the state cartographic program and the State Mapping Advisory Committee.

One of the major outcomes of these concerns and efforts was the development of State House Bill 1216 to establish an Office of Geographic Information as sponsored by Representative Marlene Fish during the 1986 legislature. This bill, although not passed, helped elevate the needs for coordination as perceived by various interests in Colorado, even though the bill itself was unsuccessful.

2.4 Executive Response

Due to the growing coordination need, an effort was conducted by the Governor's Office during the summer of 1986 to bring together state agencies in an informal GIS Committee. A letter was sent by Governor Lamm, and representatives of the Departments of Natural Resources, Local Affairs, and Highways met and developed an inventory of geographic

information. The inventory was published in July of that year, but the group disbanded soon afterwards due to lack of staffing for the effort.

During the remainder of 1986, state government was facing a new administration and most interested persons felt it appropriate to wait until after the election of a new Governor to begin related initiatives. During this time, however, a survey of geographic information activities was conducted in Colorado's counties. As of June 1987, this information is continuing to be compiled and analyzed. The consensus of interested persons and Representative Fish was to present the issue of geographic information to Governor-Elect Roy Romer.

At a presentation on December 29, 1986, many representatives requested the Governor's consideration of this issue. A proposal addressing the Governor's concerns expressed at that meeting was prepared and delivered to Chief of Staff Robert C. Dickeson by Representative Fish on January 30, 1987. Lowell B. Jackson was recently asked to take the lead in coordinating geographic information in Colorado.

Since Governor Romer's inauguration, a variety of geographic information coordination efforts have developed. The Metro Denver Network is emerging under the sponsorship of the Denver Chamber of Commerce and other chambers of commerce and governments to provide an information resource regarding potential sites for business development. This system will provide geographic information in a textual format specifically for economic development purposes, but economic development efforts could be enhanced by state governmental information. A global positioning systems committee with members representing all levels of government and the private sector has been developed as part of the previously described land records reform initiative.

3. Geographic Information Systems Initiatives

3.1 Department of Natural Resources (DNR): Division of Wildlife

The Department of Natural Resources Division of Wildlife developed an automated wildlife inventory in the early 1970s. This system was jointly developed with the U.S. Fish and Wildlife Service and now operates on Techtronix terminals linked to Colorado State University's CYBER computer. Their GIS software, SAGIS, is operative in the public domain. The division has worked with the Bureau of Land Management, the U.S. Forest Service, as well as with the U.S. Fish and Wildlife Service, and it is utilizing the state's 1:50,000 maps series. Unfortunately, this system has not received funding levels appropriate to enhance its capabilities.

3.2 Department of Local Affairs (DLA): Division of Local Government

The Department of Local Affairs purchased software and a Prime minicomputer in 1980 to develop GIS capabilities for the department's needs. The complete ARC/INFO software package was purchased in 1984 and

its capabilities have been kept up to date with enhancements. The system is used to identify local governmental and special district boundaries to support property tax mill levy assessments and to accurately distribute Conservation Trust Fund monies received through the state lottery. The system is housed within the State Demographer's Office and provides information for special projects required by the Department. The system has also been used with the Denver Public Library to develop an electronic atlas which provides chosen information to the public in a hard copy map. The GIS has met many of the objectives of the Department; however, its capabilities have not been fully utilized due to financial limitations.

3.3 Department of Highways (DOH): Division of Transportation Planning

The Colorado Department of Highways purchased ARC/INFO software in 1986 and operates its system on a micro VAX. The system was purchased to provide mapping support for the Department's transportation planning functions, and the Department already has found the system cost effective in terms of time and cost savings, even though it has been operational for less than a year. The Department is in the process of purchasing a digital cartographic base at a scale of 1:24,000 to be associated with a variety of highway information. Arrangements have been made to allow other agencies to also use this base without additional licensing costs.

3.4 Department of Health (CDH): Water Quality Control Division

Initiated in 1987, the Department of Health began a cooperative project with USGS's Water Resources Division to test the application of a GIS to determine the vulnerability of ground water resources in the Denver metro area. The objective of the project is to develop a plan to integrate data from various sources to provide for ground water management. The initial phase of the project is being developed for Boulder County on DRC/INFO software on a Prime Computer located at USGS's Water Resources Division.

3.5 URS Corporation: Supercollider Project Proposal

The State of Colorado contracted in 1987 with URS Corporation to help develop our proposal for the U.S. Department of Energy's Superconducting Supercollider Project. URS is using its in-house GIS to manage and display relevant information and build scenarios for the state's proposal.

4. Summary

This report representing our first analysis of geographic information in Colorado, is a brief review of past coordination efforts and Geographic Information Systems initiatives in Colorado's State government. Colorado has experienced a number of formal coordination initiatives in the past and continues to have some successful informal linkages between agencies. This report's historic perspective provides a common reference and some lessons learned in our current initiative to improve the effectiveness of geographic information. It also provides a basis from which we can compare existing conditions in Colorado with other states. An analysis of other states, to be completed later in July, 1987, will help to identify our comparative strengths, weaknesses and opportunities for the future.

A companion effort with this review is the initiation of an inventory of information systems and sources in Colorado that can be referenced by geographic location. Knowledge of these systems will begin development of a Colorado Geographic Information Resource and identify areas of common interest to promote shared utilization and integration for statewide needs. These efforts with direction from the Governor and Cabinet will develop the focus and framework for our development of an information policy and geographic information resource for Colorado.